



Sheet (3) Electrical Transformers

- 1) The no-load current of a transformer is 10 A at a power factor of 0.25 lagging, when connected to 400 V, 50 Hz supply. Calculate:
 - a) Magnetizing component of no-load current.
 - b) Iron loss and c) Maximum value of flux in the core assume that primary winding turns are 500.
- 2) A 15 kVA, 2200/110 V transformer has $R_1=1.75 \Omega$, $R_2=0.0045 \Omega$. The leakage reactances are $X_1=2.6 \Omega$ and $X_2=0.0075 \Omega$. Calculate:
 - a) Equivalent resistance referred to primary
 - b) Equivalent resistance referred to secondary
 - c) Equivalent reactance referred to primary
 - d) Equivalent reactance referred to secondary
 - e) Equivalent impedance referred to primary
 - f) Equivalent impedance referred to secondary
 - g) Total copper loss
- 3) 250/125 V, 5 kVA single phase transformer has primary resistance of 0.2Ω and reactance of 0.75Ω . The secondary resistance is 0.05Ω and reactance of 0.2Ω .
 - a) Determine its regulation while supplying full load on 0.8 leading p.f.
 - b) The secondary terminal voltage on full load and 0.8 leading p.f.
- 4) A 4 kVA, 200/400 V, 50 Hz, single phase transformer has equivalent resistance referred to primary as 0.15Ω . Calculate:
 - a) The total copper loss on full load
 - b) The efficiency while supplying full load at 0.9 p.f lagging
 - c) The efficiency while supplying half load at 0.8 p.f laggingAssume total iron losses = 60 W.
- 5) A 5 kVA, 500/250 V, 50 Hz, single phase transformer gave the following readings,
O.C. Test: 500 V, 1 A, 50 W (L.V. side open)
S.C. Test: 25 V, 10 A, 60 W (L.V. side shorted)
Determine:
 - a) η % on full load, 0.8 lagging p.f.
 - b) The voltage regulation on full load, 0.8 leading p.f.
 - c) η % on 60% of full load, 0.8 leading p.f.
 - d) Draw the equivalent circuit referred to primary and insert all the values in it.

- 6) The O.C. and S.C. tests on a 10 kVA, 125/250 V, 50 Hz, single phase transformer gave the following results:
O.C. Test: 125 V, 0.6 A, 50 W (on L.V. side)
S.C. Test: 15 V, 30 A, 100 W (on H.V. side)
Calculate:
a) Copper loss on full load
b) Full load η % at 0.8 leading p.f.
c) Half load η % at 0.8 leading p.f.
d) Regulation at full load, 0.9 leading p.f.
- 7) A 2500/250 V, 50 Hz, 50 kVA, single phase transformer has a resistance of 0.8 Ω and 0.012 Ω and a reactance of 4 Ω and 0.04 Ω for H.V. and L.V. windings respectively. Transformer gives 96% maximum efficiency at 75% full load at unity p.f. The magnetizing component of no load current is 1.2 A on 2500 V side. Find out ammeter, voltmeter and wattmeter readings on O.C and S.C. test if supply is given to the 2500 V side in both cases.

Best wishes
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